

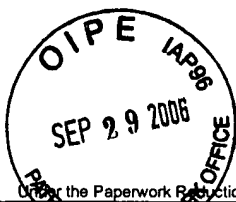
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TRANSMITTAL FORM (to be used for all correspondence after initial filing)		Application Number	09/868,244-Conf. #7004
		Filing Date	July 10, 2001
		First Named Inventor	Mikko Sievanen et al.
		Art Unit	3711
		Examiner Name	W. M. Pierce
Total Number of Pages in This Submission	44	Attorney Docket Number	43289-201088

ENCLOSURES (Check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input checked="" type="checkbox"/> Amendment/Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please identify below):
<div>Remarks</div>		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT			
Firm Name	VENABLE LLP		
Signature			
Printed name	Eric J. Franklin		
Date	September 29, 2006	Reg. No.	37,134



FEE TRANSMITTAL For FY 2005 <small>Effective on 12/08/2004. Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).</small>		Complete if Known	
		Application Number	09/868,244-Conf. #7004
		Filing Date	July 10, 2001
		First Named Inventor	Mikko Sievanen et al.
		Examiner Name	W. M. Pierce
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27		Art Unit	3711
TOTAL AMOUNT OF PAYMENT		(\$)	0.00
		Attorney Docket No.	43289-201088

METHOD OF PAYMENT (check all that apply)	
<input type="checkbox"/> Check	<input type="checkbox"/> Credit Card
<input type="checkbox"/> Money Order	<input type="checkbox"/> None
<input type="checkbox"/> Other (please identify): _____	
<input type="checkbox"/> Deposit Account	Deposit Account Number: 22-0261
Deposit Account Name: Venable LLP	
For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)	
<input type="checkbox"/> Charge fee(s) indicated below	<input type="checkbox"/> Charge fee(s) indicated below, except for the filing fee
<input checked="" type="checkbox"/> Charge any additional fee(s) or underpayment of fee(s) under 37 CFR 1.16 and 1.17	<input checked="" type="checkbox"/> Credit any overpayments

FEE CALCULATION							
1. BASIC FILING, SEARCH, AND EXAMINATION FEES							
	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		<u>Small Entity</u>		<u>Small Entity</u>		<u>Small Entity</u>	
Application Type	Fee (\$)	Fee (\$)	Fee (\$)	Fee (\$)	Fee (\$)	Fee (\$)	Fees Paid (\$)
Utility	300	150	500	250	200	100	_____
Design	200	100	100	50	130	65	_____
Plant	200	100	300	150	160	80	_____
Reissue	300	150	500	250	600	300	_____
Provisional	200	100	0	0	0	0	_____
2. EXCESS CLAIM FEES							
						<u>Small Entity</u>	
						Fee (\$)	Fee (\$)
Each claim over 20 (including Reissues)						50	25
Each independent claim over 3 (including Reissues)						200	100
Multiple dependent claims						360	180
Total Claims		Extra Claims	Fee (\$)	Fee Paid (\$)	Multiple Dependent Claims		
_____ - 20 = _____		x _____	= _____		Fee (\$)	Fee Paid (\$)	
HP = highest number of total claims paid for, if greater than 20.							
Indep. Claims		Extra Claims	Fee (\$)	Fee Paid (\$)			
_____ - 3 = _____		x _____	= _____				
HP = highest number of independent claims paid for, if greater than 3.							
3. APPLICATION SIZE FEE							
If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).							
Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)			
_____ - 100 = _____	/50	_____ (round up to a whole number) x _____	= _____				
4. OTHER FEE(S)							
Fees Paid (\$)							
Non-English Specification, \$130 fee (no small entity discount)							
Other (e.g., late filing surcharge): _____							

SUBMITTED BY			
Signature		Registration No. (Attorney/Agent)	37,134
Name (Print/Type)	Eric J. Franklin	Telephone	(202) 344-4936
		Date	September 29, 2006



THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Sievänen et al.

Application No.: 09/868,244

Filed: July 10, 2001

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Attorney Docket: 43289-201088

Art Unit: 3711

Examiner: W. Pierce

Title: CONSTRUCTION ELEMENT FOR A BOWLING LANE AND A BOWLING LANE

BRIEF ON APPEAL

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

This Brief is pursuant to the Notice of Appeal filed May 30, 2006.

Real Party In Interest

The real party in interest in this appeal is the assignee, SYSTEM-300 GROUP OY, Osuusmyllynkatu 5, FIN-33700, Tampere, Finland, by virtue of an assignment from the inventors to SYSTEM-300 GROUP OY, which was recorded in the U.S. Patent and Trademark Office on July 16, 2001, at reel 012003, frame 0162.

Related Appeals and Interferences

Applicants are unaware of any related appeals or interferences which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

The application as filed included claims 1-10. In the response submitted June 5, 2002, to the office action issued March 7, 2002, Applicant cancelled claims 1-10 and presented claims 11-27. In the response submitted September 19, 2002, to the office action issued June 19, 2002, Applicant amended claims 11 and 26 and cancelled claim 23. On October 18, 2002, Applicant submitted a Request For Continued Examination. In the response submitted November 18, 2003, to the office action issued June 18, 2003, Applicant amended claims 12-15, 17-19, 21, 22, 24-26, and presented claim 28. Applicants submitted a second Request For Continued Examination on December 18, 2003. In the response submitted August 17, 2004, to the office action issued May

17, 2004, Applicants amended claims 26 and 28. In the final office action dated December 16, 2004, claims 12-22 and 24-28 were finally rejected. Applicants appealed the rejection of all finally rejected claims. The Examiner reopened prosecution and in the office action dated August 4, 2005, rejected claims 12-22 and 24-28. In the response submitted November 4, 2005, Applicants amended claims 12, 26, and 26 and added claim 29. In the final office action dated January 27, 2006, claims 12-22 and 24-29 were finally rejected. Applicants appealed the rejection of all finally rejected claims in the notice of appeal dated May 30, 2006.

Status of Amendments

Applicant has not filed any amendments subsequent to the final rejection.

Summary of Claimed Subject Matter

The present invention relates to bowling lanes and in particular to improved bowling lanes made up of a plurality of lightweight sections. Traditionally, bowling lanes are composed of a substructure and boards attached thereto or of wood strips attached to each other. The substructure is usually a trussed construction made of wood beams. Typically, there are several boards placed on top of each other so that the required strength properties are attained. If the surface material of the lane is synthetic material instead of wood, a laminate layer is typically attached on the outer surface of the topmost board.

A bowling lane is composed of an approach, a ball track and a pin deck. Different parts

of the bowling lane require different qualities, which have to be taken into account when the lane is designed. By the approach, the lane has to endure, for example, the weight of the bowler, and as far as the ball track and the pin deck are concerned, impact resistance and the friction on the surface of the lane are important features.

Problems associated with known construction elements for bowling lanes include complexity of installation, heavy elements, relatively high price of the elements as well as poor sales value due to the complexity of the installation/disassembly. The construction of the bowling lanes is not optimized either, such that the construction is appropriate for particular regions of the lanes. Also, traditional lanes, which typically include mostly wood or wood based elements easily react to changes in climate conditions. On the other hand, the different parts of the lane require different qualities. Thus, a construction that is uniform over its entire length is not the best. The specification describes the prior art and its shortcomings at page 2, line 33, through page 3, line 5.

The invention represents a completely new way of thinking in the field of bowling lanes, providing a particularly simple solution that is especially effective at addressing these problems. For example, the present invention provides light and inexpensive construction elements that can be easily assembled, disassembled and moved about. This makes it easy to construct a temporary lane. Additionally, the easily assembly and disassembly gives the present invention a better resale value since it is made to be taken apart and moved.

The construction element is capable of withstanding the forces that a bowling lane

typically encounters. The present invention also provides a very stable bowling lane construction.

The modular nature of the bowling lane and construction elements makes it possible to optimize the lane characteristics for each portion of a lane. The particular construction of the lane elements makes them better able to endure changes in temperature and humidity. Construction elements according to the present invention may be made with a bowling surface on both sides, making it possible to turn the construction element with either side facing up so that if one side is worn, the element may be flipped over and other side easily utilized.

As recited in independent claim 26, the present invention includes a sectional bowling lane. (*See* page 3, lines 18-22; and page 5, lines 34-36.) The bowling lane includes a substructure comprising beams. (*See* page 5, lines 31-34; and Fig. 3.) A plurality of construction elements is arranged on top of the substructure. (*See* page 5, lines 34-36.) Each construction element includes at least one supporting structure layer including a cellular board (page 4, lines 16-17), an impact stress enduring board layer attached to opposite sides of the supporting structure layer (page 4, lines 12-17), and at least one impact-resistant laminate layer (page 4, lines 19-21) attached to the board layer on at least one side of the supporting structure layer (page 3, lines 20-22; page 5, lines 20-22; and Fig. 1). The construction elements are operatively connected to each other. (*See* page 5, lines 34-36.)

The invention as recited in independent 28 includes a construction element for a sectional bowling lane. (*See* page 3, lines 7-9) The construction element includes at least one supporting

structure layer including a cellular board. (See page 4, lines 16-17.) An impact stress enduring board layer is attached to opposite sides of the supporting structure layer. (See page 4, lines 12-17.) At least one impact resistant laminate layer (page 4, lines 19-21) is attached to the board layer on at least one side of the supporting structure layer (page 3, lines 20-22; page 5, lines 20-22; and Fig. 1). The construction element is configured to be operatively connectable to at least one other construction element. (See page 5, lines 34-36.)

As recited in independent claim 29, the present invention includes a construction element for a sectional bowling lane. (See page 3, lines 7-9.) The construction element includes at least one supporting structure layer including a cellular board. (See page 4, lines 16-17.) The cellular board includes a plurality of cells (page 5, lines 9-10; and Figs. 1 and 2). Each cell includes a plurality of walls substantially traverse to the supporting structure layer. (See page 5, lines 9-18; and Figs. 1 and 2.) A board layer having a thickness between 5 and 30 millimetres (page 4, line 30) and a density over 1000 kg/m^3 (page 4, lines 23-24) is attached to opposite sides of the supporting structure layer (page 4, lines 12-17). At least one laminate layer is attached with an adhesive medium to the board layer (page 5, lines 4-7) on at least one side of the supporting structure layer (page 3, lines 20-22; page 5, lines 20-22; and Fig. 1). The construction element is configured to be operatively connectable to at least one other construction element. (See page 5, lines 34-36.)

Grounds Of Rejection To Be Reviewed On Appeal

- I. The Examiner rejected claim 29 under 35 U.S.C. § 112, first paragraph as not complying with the written description requirement.
- II. The Examiner rejected claims 12-17, 19-22, and 24-29 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent 4,557,961 to Gorges in view of Materials Science and Engineering.
- III. The Examiner rejected claim 18 under 35 U.S.C. § 103(a) as being unpatentable over Gorges in view of Materials Science and Engineering in view of U.S. patent 4,337,290 to Kelly.
- IV. The Examiner rejected claims 17-22 and 26-28 under 35 U.S.C. § 103(a) as being unpatentable over Brunst in view of Kelly.
- V. The Examiner rejected claims 12-14 under 35 U.S.C. § 103(a) as being unpatentable over Brunst in view of Kelly and further in view of U.S. reissue patent 35,778 to Stirling, Materials Science and Engineering and U.S. patent 5,106,668 to Turner.
- VI. The Examiner rejected claims 15 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Brunst in view of Kelly, Stirling, Materials Science and Gorges.

Argument

I. Claim 29 complies with 35 U.S.C. § 112, first paragraph.

The clearly describes connecting construction elements of the present invention together to form a bowling lane. For example, the specification at page 3, lines 18-31, describes building bowling lanes from construction elements of the present invention. This passage describes manipulating individual elements when they become worn. Also, this passage describes tailoring the specification of the construction elements to different requirements of various regions of a bowling lane. Furthermore, at page 5, lines 30-36, the specification describes installation of a bowling lane from construction elements of the present invention. The bowling lane is shown in Fig. 3. The bowling lane is described in greater detail at page 6, lines 1-10.

The construction of the elements is clearly set forth in the specification and drawings. The specification further describes connecting together the construction elements to form a bowling alley. One of ordinary skill in the art once aware of the present specification would, without undue experimentation, be able to connect construction elements of the present invention together. Therefore, the specification adequately describes the subject matter of claim 29 and claim 29 complies with 35 U.S.C. § 112, first paragraph.

I. Claims 12-17, 19-22, and 24-29 are patentable under 35 U.S.C. § 103(a) over U.S. patent 4,557,961 to Gorges in view of Materials Science and Engineering.

Gorges does not suggest the present invention as recited in claims 12-17, 19-22, or 24-29 since, among other things, Gorges does not suggest a structure that includes a cellular board, impact stress enduring layer and impact laminate layer. The Examiner asserts that cells 14 of Gorges suggest the cellular board, face sheet 15 suggests the impact resistant layer and fire-retardant coating 20 suggests the impact resistant laminate layer. The Examiner cites Materials Science and Engineering as suggesting wooden structural panels and adhesive structural panels. As set forth below, the combination of Gorges and Materials Science and Engineering does not suggest the structural element of the present invention or bowling lane including the structural elements.

The construction element according to the present invention as recited in claim 28 includes a bowling surface. Additionally, claim 26 recites a sectional bowling lane and claim 29 a construction element for a bowling lane. The limitation of a bowling lane or bowling surface is not insignificant. Contrary to the Examiner's assertion, any floor cannot be a bowling surface. Any floor cannot fulfill that limitation, for example, the international patent classification recognizes bowling alleys (class A63D 1/00 including A63D 1/04) but miniature bowling alleys belong to a different class (A63D 3/00). So if even the miniature alleys are in different class the concept of the bowling lane (alley) is very specific. The Examiner goes beyond this to assert that any surface in the world could act as a bowling lane. This interpretation of the feature "bowling lane" is incomprehensible. While a bowling ball could be rolled along a surface, this does not

make the surface a bowling lane. A bowling lane has a specific meaning. It is clear from the specification that the present invention relates to commercial bowling lanes. For example, page 4, line 36, through page 5, line 2, of the specification refer to dimensions for a bowling lane that are directly from ABC rules.

The Examiner asserts that he can give the broadest possible interpretation to the words in the claims. However, *Vitronics v. Conceptronic, Inc.*, 39 U.S.P.Q.2d 1573 (Fed. Cir. 1996), states that if the applicant gives a reasonable interpretation in the application, the examiner should not rely on the extrinsic evidence, e.g. dictionaries. When considering the present specification, it is obvious that the referred bowling lane is a professional lane, not for example a floor for playing with plastic pins. In view of the above, the Examiner's statement that the limitation is insignificant is incorrect.

Gorges does not suggest a bowling surface that includes an impact resistant laminate layer. The Examiner asserts that fire-retardant coating 20 suggests the impact resistant laminate layer. The fire retardant coating 20 suggested by Gorges includes a copolymer of vinylidene fluoride and hexafluoropropene. The coating is to protect against fire hazards. Gorges does not disclose that the coating is a laminate. Along these lines, it is well established, such as by Merriam-Webster Online Dictionary, that a laminate is "a product made by laminating" and "laminating" means "to make (as a windshield) by uniting superposed layers of one or more materials". On the other hand, Merriam-Webster Online Dictionary defines a coating as "a layer of one substance covering another".

Furthermore, Gorges does not disclose that the fire retardant coating is a bowling surface or is impact resistant. Claim 28 recites that the laminate layer is a bowling surface. As described above, contrary to the Examiner's assertions, this is a real limitation. Applicants have previously established the standards for a bowling lane. Any surface would not be suitable for a bowling lane nor is any surface impact resistant in the context of a bowling lane, which is what claim 28 recites. Following the Examiner's line of reasoning, balsa wood would be impact resistant. However, it would not provide a bowling surface, if for no other reason than upon impact by a bowling ball, the balsa wood would not provide a bowling surface. It would also not be a laminate layer. Claim 28 recites a bowling lane surface that includes a laminate layer.

Gorges also does not disclose an impact stress enduring board layer. Rather, Gorges discloses a face sheet 15 that is a fibrous material impregnated with phenolic resin so as to enhance the fire resistance characteristics of the panel. Gorges does not disclose that the face sheet is an impact stress enduring layer or a board layer. The Examiner asserts Gorges suggests that a board layer that includes a wood-based board. However, Gorges only describes a wood-based board with respect to the cellular core layer 11, not the face sheet. Therefore, Gorges does not disclose the impact stress enduring board layer recited in claims 26 or 28.

Materials Science and Engineering does not overcome any of the above-discussed deficiencies of Gorges. Along these lines, Materials Science and Engineering does not suggest a bowling lane, a cellular board, an impact stress enduring layer and an impact laminate layer. The Examiner fails to set forth how to combine Gorges and Materials Science and Engineering. Along these lines, M.P.E.P. § 2142 provides that, "The initial burden is on the examiner to

provide some suggestion of the desirability of doing what the inventor has done. To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references (*Ex parte Clapp*). This section goes on to provide that, "When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the combination of the teachings is proper (*Ex parte Skinner*)". The Examiner has not fulfilled the requirements of the M.P.E.P. in making this rejection, but has rather just asserted that the combination may be made.

In view of the above, the present invention as recited in claims 12-17, 19-22, and 24-29 are patentable under 35 U.S.C. § 103(a) over U.S. patent 4,557,961 to Gorges in view of Materials Science and Engineering and Applicants respectfully request withdrawal of this ground of rejection.

II. Claim 18 is patentable under 35 U.S.C. § 103(a) over Gorges in view of Materials Science and Engineering in view of U.S. patent 4,337,290 to Kelly.

The combination of Gorges, Materials Science and Engineering and Kelly does not suggest the present invention as recited in claim 18 since, among other things, Kelly does not overcome the above-described deficiencies of Gorges and Materials Science and Engineering. The Examiner asserts that Kelly suggests paper impregnated with resin as a board-like material for creating laminates. As noted above, Gorges does not suggest a laminated structure. Rather,

Gorges suggests a fire retardant coating 20 that includes a copolymer of vinylidene fluoride and hexafluoropropene. Gorges does not disclose that the coating is a laminate. Furthermore, Gorges does not suggest a bowling surface that is a laminate or a laminate that is impact resistant. Kelly does not suggest any of these features and also does not suggest a cellular board, impact stress enduring layer and impact laminate layer.

In view of the above, the present invention as recited in claim 18 is patentable under 35 U.S.C. § 103(a) over U.S. patent 4,557,961 to Gorges in view of Materials Science and Engineering and Applicants and U.S. patent 4,337,290 to Kelly and Applicants respectfully request withdrawal of this ground of rejection.

III. Claims 17-22 and 26-28 are patentable under 35 U.S.C. § 103(a) over Brunst in view of Kelly.

The combination of Brunst and Kelly does not suggest the present invention as recited in claims 17-22 and 26-28 since, among other things, the combination does not suggest a board layer or a cellular structure. The Examiner asserts that the wood material suggested by Brunst is cellular material because plants contain plant cells. Brunst suggests a structure that includes wooden strips attached together to form a solid piece. This is the only wood in the structure and the Examiner asserts that this suggests the cellular structure recited in the claims. Clearly, the cells of the cellular structure according to the present invention are not simply plant cells. Also, wood does not contain plant cells, but rather portions of remnants of plant cells. Additionally, the claims recite a cellular board that includes a plurality of cells each having a longitudinal axis

extending in a direction perpendicular to the cellular board. Any structure that includes plant cells, which are randomly shaped and oriented, does not suggest such a structure.

Further, the Examiner asserts that layers 31 and 32 suggest board layers. Brunst discloses that "laminate members 31 and 32 which form a part of the subject panel member 10 typically comprise a thermosetting resin impregnated core overlaid with a protective thermosetting resin impregnated paper overlay or a thermosetting resin overlay coating. In addition, laminate 31 which is adhered to the top face 22 of core 20 includes a decorative layer or print sheet disposed between the resin impregnated core and the protective overlay, said print sheet having the customary bowling lane indicia such as wood grain, marker darts etc." Contrary to the Examiner's opinion, if laminate members 31 and 32 were considered to resemble any portion of the structure of the present invention as recited in claims 17-22 and 26-28 it would resemble the impact-resistant laminate layer. For example, Applicants direct the Examiner's attention to page 4, line 29 of the specification, which describes the laminate 1 as made of multilayer paper impregnated with resin. That the laminate members 31 and 32 resemble the impact-resistant laminate layer is supported by Brunst at col. 4, lines 46-58. Thus, Brunst does not suggest a board layer.

Brunst et al. suggests a panel member made of wooden strips attached together. In other words, the wooden core is solid. A high pressure laminate member is adhered to each face of the wooden panel. To address issues of impact resistance, Brunst suggests sealing an entire wooden element, made flat by sanding, inside a protective laminate. Once the lane element reaches the end of its life span, Brunst suggests changing the element.

Combining Brunst and Kelly does not suggest the present invention as recited in claims 17-22 and 26-28 since, among other things, Kelly does not overcome the above-discussed deficiencies of Brunst et al. For example, Kelly also does not suggest a board layer or a cellular structure. Kelly suggests laminate that includes glass cloth or crepe paper layers impregnated with a thermosetting resin. Thus, Kelly suggests a layer which resembles laminate member 31 of Brunst and does not suggest the structure of the present invention as recited in the claims.

In view of the above, the present invention as recited in claims 17-22 and 26-28 is patentable under 35 U.S.C. § 103(a) over Brunst in view of Kelly and Applicants respectfully request withdrawal of this ground of rejection.

IV. Claims 12-14 are patentable under 35 U.S.C. § 103(a) over Brunst in view of Kelly and further in view of U.S. reissue patent 35,778 to Stirling, Materials Science and Engineering and U.S. patent 5,106,668 to Turner.

The combination of Brunst, Kelly, Stirling, Materials Science and Engineering and Turner does not suggest the present invention as recited in claims 12-14 since, among other things, Stirling, Materials Science and Engineering and Turner do not overcome the above-discussed deficiencies of Brunst and Kelly. Along these lines, the combination of Brunst, Kelly, Stirling, Materials Science and Engineering and Turner does not suggest replacing the plant cells in the structure suggested by Brunst with honeycomb cells, particularly since natural plant cells, which the Examiner has equated with the cells in the cellular layer of the present invention, have

varying sizes, shapes, orientations, among other characteristics.

Also, Stirling simply suggests screwing a resurfacing layer on the top surface of an existing bowling lane to refinish the bowling lane. Such does not suggest the multilayer construction of the present invention. In fact, Stirling is contrary to the present invention since the present invention as recited in claims 12-14, which depend from claim 28, includes a construction element for a sectional bowling lane, wherein the sections can be flipped or replaced individually in refurbishing a lane. Screwing a surface suggested by Stirling onto the structure suggested by Brunst would not suggest the structure of the present invention as recited in the claims.

On the other hand, Turner suggests an aircraft floor structure. Such a structure does not undergo the stresses that a bowling lane undergo and does not need to maintain the tolerances of the bowling lane surface. Applicants have demonstrated the criticality of the impact resistance of the structure of the present invention through the attached bowling lane specifications. As recited in the claims, the present invention provides a construction element for a **bowling lane** and a sectional **bowling lane**. A bowling lane must endure the impact of bowling balls being flung onto it repeatedly.

Turner does not suggest board layers or laminate layers attached to a honeycomb, only another honeycomb structure and skin. The skin layer is a part of the honeycomb, not a layer attached to the honeycomb structure. Therefore, the skin is not another layer attached to the honeycomb, but rather is a part of the honeycomb. Turner does not suggest a structure that can

withstand repeated impacts. Along these lines, col. 1, lines 62-66, state that the second honeycomb is "not, by itself, able to withstand the impact or bending stresses which can be supported by the laminated structure."

The Examiner simply asserts that layered structures are known and that honeycomb panels are known but does not provide any details regarding how the various elements suggested by Brunst, Kelly, Stirling, Materials Science and Engineering, and Turner would be recombined. For example, the Examiner asserts that Stirling suggests sandwich panels but suggests replacing the panel of Brunst with a honeycomb. The rejection lacks the necessary specificity, but rather simply includes a listing of elements that the references suggest.

Contrary to the Examiner's assertion, the present invention is not merely the use of honeycomb panels in a bowling alley. Clearly as recited in the claim, the present invention is not just honeycomb panels intended for use in a bowling lane. The present invention is a multilayer structure that includes as one of the layers a honeycomb panel. However, the present invention also includes other layers.

Including known materials does not make an invention anticipated or obvious. Certainly mechanical inventions are typically made of known materials and utilize known principles. However, the way that these known materials are put together is new. This is the case with the present invention.

In the rejection, the Examiner states that using honeycomb panels "would have been an

obvious matter of replacing one known sandwich type panel for that of another". It is known buckling and warpage effects can occur in connection with honeycomb structures. These buckling and warpage effects are highly undesirable features in the construction element for a bowling lane. In view of the above, one of ordinary skill in the art would not consider utilizing a honeycomb structure in a bowling lane construction element.

While honeycomb structures are known, their vulnerability to impact is also known. This vulnerability was described in *Symposium on Recent Developments in the Study of Impacts on Composite Materials*, held at Virginia Tech in June 1999, as well as on the website of Finite Element Analysis, Ltd., which was last modified on March 17, 2003. The abstract attached hereto as Exhibit II of the attached Evidence Appendix, was submitted in conjunction with the *Symposium on Recent Developments in the Study of Impacts on Composite Materials* is attached hereto. This abstract entitled *The formation of Barely Visible Impact Damage in Honeycomb Sandwich from a Soft Body* describes that composite materials, such as Nomex honeycomb composite, have relatively low resistance to impact damage. The website of Finite Element Analysis, Ltd., under the tradename LUSAS, goes further, stating that honeycomb sandwich panels "are generally poor at resisting impact damage."

The attached rules of the American Bowling Congress governing bowling lanes demonstrate the stringent requirements for bowling lanes, such as a crosswise tilt of less than 0.004 inch over the width of a lane. One of ordinary skill in the art might be aware of cellular structures used in other fields. However, as is apparent from the reference materials attached hereto, one of ordinary skill in the art would also know of the susceptibility of such structures to

damage from impacts. As described in *Symposium on Recent Developments in the Study of Impacts on Composite Materials*, at first, dents would appear and then the cellular structure would start to lose its strength.

It is clear that the low impact resistance of honeycomb panels is known and was known at the time the present invention was made. These facts provide sufficient evidence that it would not have been obvious at the time the present invention was made to employ cellular structures in a bowling lane. It follows that it would not be obvious to combine the references in the manner asserted the by Examiner.

Applicants do not claim to be the inventors of honeycomb panels or any of the other layers that make up the construction element of the present invention. Nor are Applicants only claiming honeycomb panels. However, Applicants have invented a new bowling alley construction element that is inexpensive, light weight, can be easily assembled and disassembled, and endures humidity and temperature changes better than known bowling alley construction elements.

The court in *In re Burke Inc.*, 22 U.S.P.Q.2d 1368 (C.D. CA 1992), found that a combination of elements is patentable. Along these lines, the court found that a claim for three-wheeled "personal mobility vehicle" is not obvious, even though individual elements of claim were known in prior art, since claim discloses flexibility in use of vehicle both indoors and outdoors at particular sites, and convenient separation of vehicle into components small and light enough for easy transportation, as new or different function flowing from claimed

combination.

Similarly, in *Ex parte Hiyamizu*, 10 U.S.P.Q.2d 1393 (Bd. of App. 1988), the Board of Appeals found that, "It is to be noted, however, that citing references which merely indicate that isolated elements and/or features recited in the claims are known is not a sufficient basis for concluding that the combination of claimed elements would have been obvious." In this case, Applicants are claiming a unique combination of layers that is not obvious based upon the cited references.

The construction element of the bowling lane must fulfill strict straightness requirements laid for the bowling lanes as exemplified by the page of the regulations of the American Bowling Congress attached hereto as Exhibit III of the Evidence Appendix. These requirements address, among other things, the need for similar conditions to prevail for each player. If such conditions cannot be guaranteed, it is not possible to hold for example bowling competitions. The bowling lane of the invention is a lane having a very stable construction.

It is unexpected to include a honeycomb panel as one element in a construction element that forms part of a bowling lane. The strength of a material does not mean that it is suitable in any application. For example, carbon fiber is one of the strongest materials known. However, once its structure is broken or fractured, it is very weak. As a result, carbon fiber structures have little or no resistance to repeated impacts. So citing a list of strong materials does not make the construction element of the present invention obvious.

In view of the above, the present invention as recited in claims 12-14 are patentable under 35 U.S.C. § 103(a) over Brunst, Kelly, Stirling, Materials Science and Engineering, and Turner and Applicants respectfully request withdrawal of this ground of rejection.

V. Claims 15 and 16 are patentable under 35 U.S.C. § 103(a) over Brunst in view of Kelly, Stirling, Materials Science and Gorges.

The combination of Brunst, Kelly, Stirling, Materials Science and Engineering and Gorges does not suggest the present invention as recited in claims 12-14 since, among other things, Stirling, Materials Science and Engineering and Gorges do not overcome the above-discussed deficiencies of Brunst and Kelly. Along these lines, Examiner the combination of Brunst, Kelly, Stirling, Materials Science and Engineering and Gorges does not suggest replacing the plant cells in the structure suggested by Brunst with honeycomb cells, particularly since natural plant cells, which the Examiner has equated with the cells in the cellular layer of the present invention, have varying sizes, shapes, orientations, among other characteristics.

The Examiner asserts that Gorges suggests filling honeycomb panel cells with polyurethane. As set forth above, none of the cited references suggests a construction element for a bowling alley or a sectional bowling alley that includes honeycomb panels. Gorges suggests an aircraft panel that includes foam fillers in the honeycomb cells spaces. Such an aircraft panel does not suggest a bowling lane or any of the elements of the bowling lane not suggested by any of the other cited references.

In view of the above, the present invention as recited in claims 15 and 16 are patentable under 35 U.S.C. § 103(a) over Brunst, Kelly, Stirling, Materials Science and Engineering, and Gorges and Applicants respectfully request withdrawal of this ground of rejection.

The present invention is not claiming mere impact resistance. Rather, the present invention, as recited in the claims is limited to a bowling alley element. As such, the present invention is functional as a bowling lane and, as a result, must be able to endure repeated impacts of bowling balls and retain its characteristics as a bowling lane. Due to its unique construction, the present invention can greatly reduce the weight of a bowling lane as compared to known bowling lane constructions. Also, the present invention makes it possible to erect a lane for temporary use. The present invention also provides a very stable bowling lane construction. The invention represents a completely new way of thinking in the field of bowling lanes that none of the cited references disclose or suggest.

At the time the present invention was made, no commercially available modular panel was suitable for a bowling lane. Seizing upon a new way of thinking, the Applicants developed a new construction element from materials known to have poor impact resistance. This way of thinking and the resulting structure are contrary to the prior art.

The present invention also provides a lightweight element, weighing just 100 kg as compared to 195 kg for known structures, as described at page 6, lines 1-10 of the specification. As a result, the laminate and board layers of the present invention need to be considerably thinner in the present invention, which is contrary to the knowledge of those skilled in the art.

One of ordinary skill in the art would know that two board layers that are positioned loosely on top of each other and have a laminate layer on the surface of the uppermost board are sufficient for attaining a reasonable lane construction, but that repairing is required from time to time. Addition of a cellular layer, which has poor impact resistance and at the same time making the board layers and laminate layer thinner and joining all of those layers together to prevent resurfacing is illogical based on the prior art.

However, unexpectedly, the present invention has proved to maintain its straightness. Also, the present invention has proven to be highly resistant to dents because the board layer, which is attached to the supporting structure layer, spreads the impact force into the plane of the board layers. Furthermore, the present invention makes it possible to optimize the impact resistance, the thickness of the various layers and the weight of the construction element in different sections of a bowling lane.

Everything, even compositions of matter are made of combinations of elements. It is the combination that the invention lies. The looking at elements in isolation does not make the combination or application of the combination obvious. The present invention is not merely a combination of boards and honeycomb panel. The present invention is a lightweight, sectional bowling alley element. When compared to the prior art of bowling alley construction, the present invention represents a vast improvement.

Conclusion

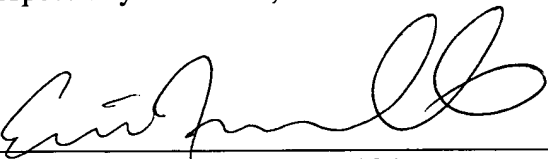
In view of the above, Applicants submit that claim 29 complies with 35 U.S.C. § 112, first paragraph, and respectfully request reversal of that ground of rejection.

Additionally, U.S. patent 4,557,961 to Gorges, Materials Science and Engineering, U.S. patent 4,337,290 to Kelly, U.S. patent 4,320,898 to Brunst et al., U.S. reissue patent 35,778 to Stirling, and/or U.S. patent 5,106,668 to Turner, whether considered alone or in combination, do not disclose or suggest patentable features of the present invention. Therefore, Gorges, Materials Science and Engineering, Kelly, Brunst et al., Stirling, and/or Turner, whether considered alone or in combination, do not anticipate the present invention or make the present invention obvious. Accordingly, Applicants submit that the present invention is patentable over Gorges, Materials Science and Engineering, Kelly, Brunst et al., Stirling, and/or Turner and respectfully request reversal of these rejections, allowance of the claims and issuance of the Notice of Allowance.

The undersigned authorizes the Commissioner to charge insufficient fees and credit overpayment associated with this communication to Deposit Account No. 22-0261.

Respectfully submitted,

Date: 9/29/06


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Claims Appendix

Claims On Appeal

1-11 (cancelled)

12. The construction element according to claim 28, wherein the supporting structure layer comprises a wall that separates cells attached to each other wall-to-wall.

13. The construction element according to claim 28, wherein the cells have a regular hexagonal cross-section.

14. The construction element according to claim 28, wherein the supporting structure layer comprises aluminum.

15. The construction element according to claim 28, further comprising a cell filling material.

16. The construction element according to claim 15, wherein the cell filling material comprises polyurethane.

17. The construction element according to claim 28, wherein the board layer comprises a wood-based board.

18. The construction element according to claim 28, wherein the laminate layer comprises at least one resin impregnated paper layer.

19. The construction element according to claim 28, wherein the laminate layer, the board layer and the supporting structure layer are fixed together permanently.

20. The construction element according to claim 19, wherein the laminate layer, the board layer and the supporting structure layer are fixed together with adhesive.

21. The construction element according to claim 28, wherein the construction element is constructed to be mirror symmetrical in such a way that on both sides of the supporting structure layers there is a board layer, and on an outer surface of both board layers there is a laminate layer.

22. The construction element according to claim 28, wherein the board layer is arranged between the laminate layer and the supporting structure.

23. (canceled)

24. The construction element according to claim 28, wherein the construction element includes a plurality of laminate layers, a plurality of board layers, and a plurality of supporting structure layers.

25. The construction element according to claim 28, wherein the construction element includes a plurality of laminate layers and a plurality of board layers.

26. A sectional bowling lane, comprising:

a substructure comprising beams; and

a plurality of construction elements arranged on top of the substructure, each construction element comprising at least one supporting structure layer comprising a cellular board including a plurality of cells each having a longitudinal axis extending in a direction perpendicular to the cellular board, an impact stress enduring board layer attached to opposite sides of the supporting structure layer, and a bowling surface comprising at least one impact-resistant laminate layer attached to the board layer on at least one side of the supporting structure layer,

wherein the construction elements are operatively connected to each other.

27. The bowling lane according to claim 26, wherein the layers of the construction elements of the bowling lane have a different thickness in different sections of the bowling lane such that an overall thickness of the construction elements remains constant on the entire lane.

28. A construction element for a sectional bowling lane, the construction element comprising:

at least one supporting structure layer comprising a cellular board including a plurality of cells each having a longitudinal axis extending in a direction perpendicular to the cellular board;

an impact stress enduring board layer attached to opposite sides of the supporting structure layer; and

a bowling surface comprising at least one impact resistant laminate layer attached to the board layer on at least one side of the supporting structure layer;

wherein the construction element is configured to be operatively connectable to at least one other construction element.

29. A construction element for a sectional bowling lane, the construction element comprising:

at least one supporting structure layer comprising a cellular board including a plurality of cells, each cell including a plurality of walls substantially traverse to the supporting structure layer;

a board layer having a thickness between 5 and 30 millimetres and a density over 1000 kg/m³ attached to opposite sides of the supporting structure layer; and

at least one laminate layer attached with an adhesive medium to the board layer on at least one side of the supporting structure layer;

wherein the construction element is configured to be operatively connectable to at least one other construction element.

Evidence Appendix

I. Abstract, Aitken et al., *The formation of Barely Visible Impact Damage in Honeycomb Sandwich from a Soft Body*, *Symposium on Recent Developments in the Study of Impacts on Composite Materials*, Virginia Tech, June 27-30, 1999.

SYMPOSIUM ON RECENT DEVELOPMENTS IN THE STUDY OF IMPACTS ON COMPOSITE MATERIALS

in conjunction with the ASME 1999 Mechanics and Materials Conference

Virginia Polytechnic Institute and State University, Blacksburg, VA

June 27-30, 1999

The formation of Barely Visible Impact Damage in Honeycomb Sandwich from a Soft Body

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Due to their high stiffness and strength ratios, composite sandwiches have been used increasingly in aerospace applications. The main drawback of these sandwich components is their relatively low resistance to impact damage and the amount by which their strength is reduced under compressive loading after such impact damage. To examine the impact damage formation of the composite sandwich, a series of high velocity impacts (greater than 100 kph) have been performed on Nomex honeycomb cored sandwich utilizing a thin (0.5 mm) glass fiber/epoxy facesheet. These impact specimens are representative of a flap trailing edge wedge component common on today's commercial aircraft. The impacts were performed with a pneumatic device launching a soft projectile 100-mm in diameter. The damage formed from this large contact area type event was seen to be large in plan area but shallow manifesting itself primarily as crushing of the sandwich core. The paper details the formation of the soft body Barely Visible Impact Damage (BVID) for impact velocities between the impact damage threshold and the limit value at which skin degradation occurs. Effects of impact incidence angle and impactor stiffness have also been reviewed. In addition to the experimental tests, a suitable finite element based predictive model to account for compressive impact failure of Nomex type honeycomb has been developed. The model is useful for predicting large plan area BVID honeycomb core crushing and relies on incorporation of a user defined honeycomb failure model. Both variations in the tensile versus compressive response and the stiffness degradation for non-metallic honeycomb in a crushed state are accounted for in the material model. Results from the finite element model have been compared to experimental data and show a good correlation for both hard and soft body impacts.

II. American Bowling Congress rules governing bowling lane specifications submitted
with Applicants' response dated November 18, 2003

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REGULATION BOWLING LANE

A regulation bowling lane, including flat gutters, kickbacks and approach, must be constructed of wood and/or other materials which have been tested according to ABC/WIBC procedures for the specified time period and approved.

Synthetic Products:

All non-wood material used in the manufacturing of lane components must be presented to ABC/WIBC for evaluation and possible testing before use in sanctioned competition. If approved, they may not be altered by the use of coatings, etc. unless these coatings have been presented to ABC/WIBC for evaluation and possible testing. In addition, all products must contain an approval label with the following requirements:

1. The label must be permanent, lasting the life of the product.
2. The label must be clearly visible after the product is installed in the bowling center.
3. The label must identify the company as the manufacturer.
4. The label must contain an approval number assigned by ABC/WIBC and state "ABC/WIBC Approved."

Approach:

Extending from and exclusive of the foul line there shall be an unobstructed level approach which shall be:

1. Not less than 15 feet in length
2. Free from depressions exceeding 1/4 inch.
3. Not less than the width of the lane.

Foul Line:

The foul line shall be:

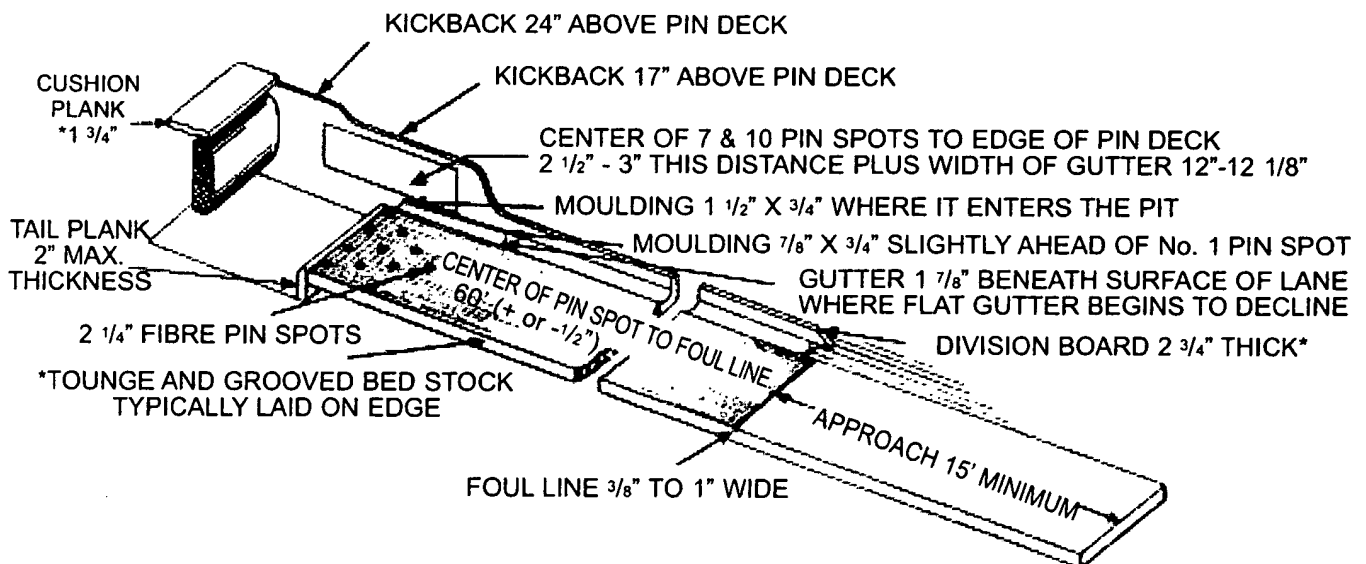
1. Not less than 3/8 inch nor more than 1 inch in width.
2. At a minimum, the entire width of the lane.
3. Distinctly marked upon or embedded between the lane and approach.

It may be required that the foul line be plainly marked on the walls, posts, division boards or any point on a line with the regular foul line.

(For more information on the foul line see the section on Automatic Foul Detecting Device.)

ABC/WIBC Regulation Bowling Lane Dimensions

Typical Cross Section of Bowling Lane—Round Gutters from foul line to pin deck area.



*NOTE: This particular measurement is not an ABC/WIBC specification but is an accepted standard for installing bowling lanes.

Composition:

The lane must be constructed entirely of wood and/or synthetic materials which have been approved by ABC/WIBC.

Length:

1. The overall length of a regulation lane, including the pin deck, has a reference dimension of 62 feet, 10 ³/₁₆ inches, measured from the lane side of the foul line to the rear edge of the pin deck (not including the tail plank).
2. It must be 60 feet, plus/minus ¹/₂ inch, from the lane side of the foul line to the center of the No. 1 pin spot.
3. It must be 34 ³/₁₆ inches, plus/minus ¹/₁₆ inch, from the center of the No. 1 pin spot to the rear edge of the pin deck (not including the tail plank).

Width:

The lane shall be 41 ¹/₂ inches, plus/minus ¹/₂ inch, wide.

Surface:

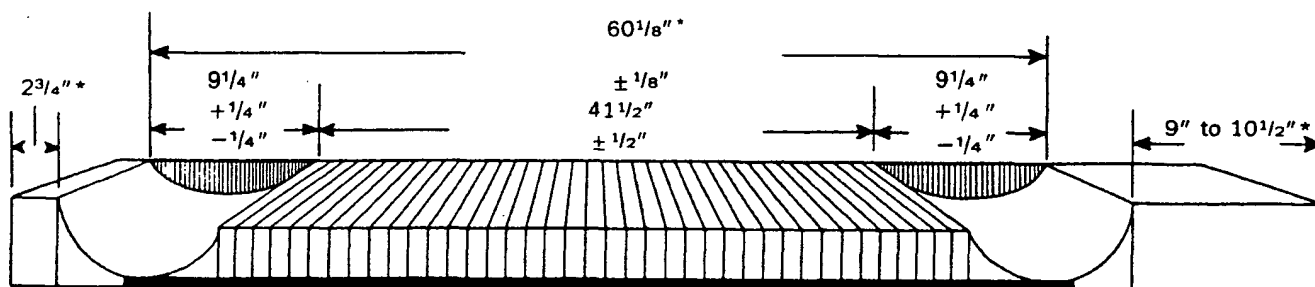
1. The surface must be free of all continuous grooves or ridges.
2. There shall be no depressions or crown in excess of ⁴⁰/₁₀₀₀ inch on the surface of the lane over a 42 inch span.
3. There shall be no crosswise tilt in excess of the ⁴⁰/₁₀₀₀ inch over the width of the lane.
4. The same lane finish coating shall be applied from the edgeboard to edgeboard.
5. The Coefficient of Friction of all lane surfaces shall not exceed .29 when measured with an ABC/WIBC approved device.

All bowling lane finish coatings as well as all synthetic lane surfaces must be submitted to ABC/WIBC for coefficient of friction testing before use in sanctioned competition.

In addition, all lane surface coatings must bear labels stating "This product complies with ABC/WIBC specifications when applied as directed by the manufacturer."

ABC/WIBC Regulation Bowling Lane Dimensions

Typical Cross Section of Bowling Lane — Round Gutters from foul line to pin deck area.



*NOTE: This particular measurement is not an ABC/WIBC specification but is an accepted standard for installing bowling lanes.

Lane and Approach Markings or Designs

Markings or designs on the lanes and approaches shall be permitted in accordance with the following specifications:

1. Measured from the foul line, a maximum of seven (7) guides may be embedded in or stamped on the approach at each of the following points: 2-6 inches; 9-10 feet; 11-12 feet, and 14-15 feet. Each series of guides shall be parallel to the foul line and each guide shall be circular in shape, and shall not exceed ³/₄ inch in diameter.
2. At a point 6-8 feet beyond the foul line and parallel thereto, there may be embedded in or stamped on the lane a maximum of ten (10) guides. Each guide shall be uniform, circular in shape, and shall not exceed ³/₄ inch in diameter.
3. At a point 12-16 feet beyond the foul line, there may be embedded in or stamped on the lane a maximum of seven targets. Each of the targets shall be uni-

form and may consist of one or more dowels, darts, diamond, triangles or rectangular designs. The overall surface covered by each target shall not be more than 1 ¹/₄ inches in width and 6 inches in length. Each target must be equidistant from one another and set in a uniform pattern.

4. At a point 33-44 feet beyond the foul line, there may be a maximum of four targets. Each target must be uniform in appearance and shall not be wider than a single board nor longer than 36 inches.
5. Embedded markings or designs shall be of wood, fibre or plastic, and shall be flush and level with the surface of the lanes and approaches.
6. When the markings are stamped on wood lanes, they shall be applied to the bare wood and then covered with lacquer, urethane, or similar liquid transparent material generally used in resurfacing. All such installations in any one center shall be uniform as to design and measurement and at least on natural pairs of lanes.

SYNTHETIC BOWLING LANE

All synthetic bowling lanes must be ABC/WIBC approved and meet all specifications for regulation bowling lanes in addition to the following:

Identification:

On synthetic lane surfaces, each panel must have at least one label that meets the following requirements:

1. The label, identifying the manufacturer, must be permanent, lasting the life of the product, and clearly visible after it is installed.
2. The label must contain an approval number assigned by ABC/WIBC and state "ABC/WIBC Approved."
3. Overlay and complete systems with the same top surface must have the same approval number.
4. The color of the label can be similar to the colors used in the pattern, as long as they are visible upon close inspection.

Gaps and Drop Off:

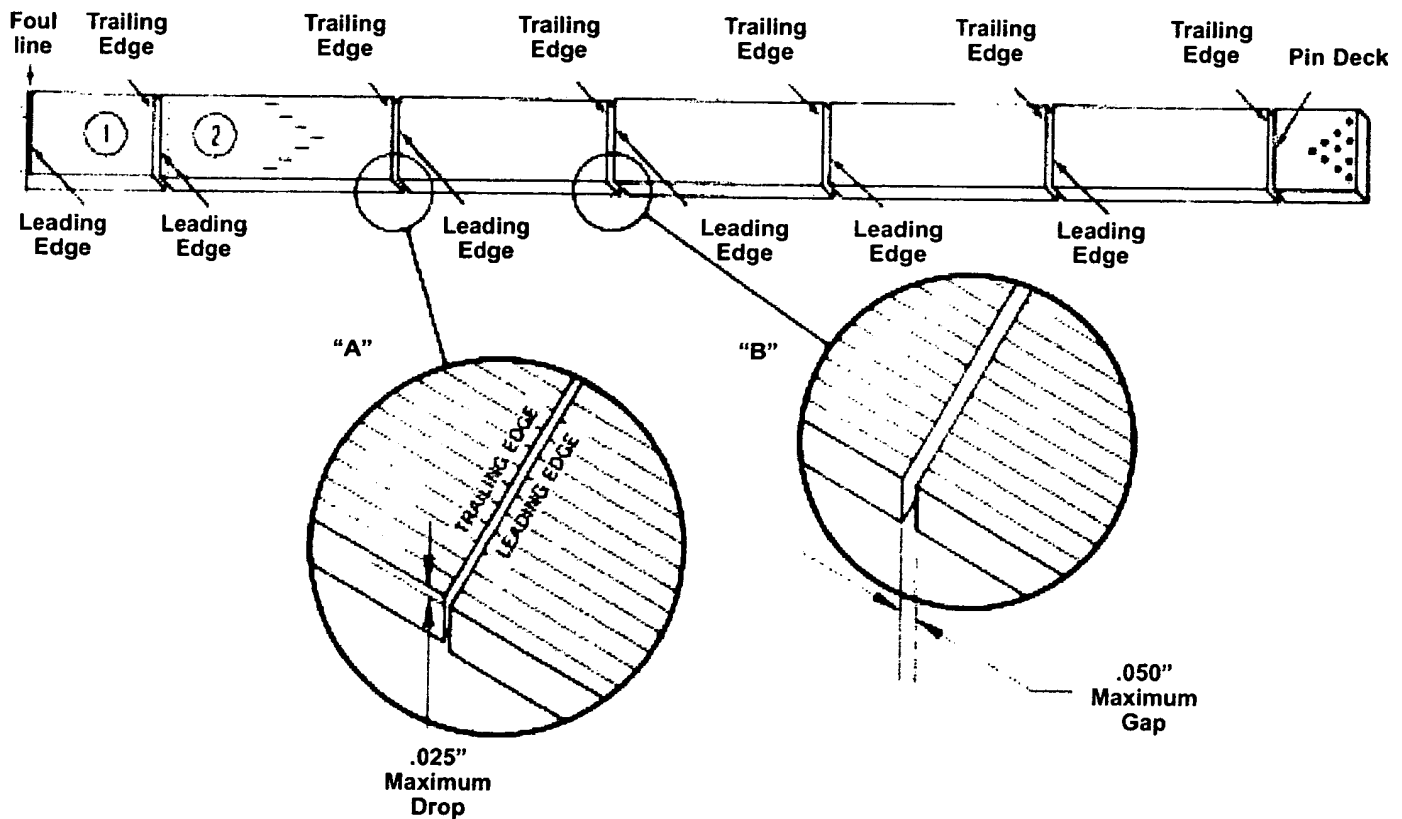
On synthetic lane surfaces, either panelized or overlay, where two panels meet, the following specifications must be met:

1. The leading edge of one panel shall be flush with, or not more than $\frac{25}{1000}$ inch below the trailing edge of the adjoining panel at any point across the width of the lane.
2. The leading edge of the first panel shall be flush with, or not more than $\frac{80}{1000}$ inch below the trailing edge of the foul line at any point across the width of the lane.
3. The gap between the leading and trailing edge of adjoining panels, across the width of the lane, shall not exceed $\frac{50}{1000}$ inch at the time of installation.

(See the following diagram for description of "leading" and "trailing" edges.)

Surface:

The surface of a synthetic lane may not be altered (coated) with any material unless first tested and approved.

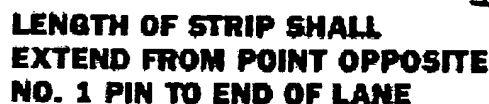


Edgeboards:

EDGE STRIP SPECIFICATIONS:

1. not less than 1 1/2 inches in depth, at time of installation on a new edgeboard
2. not less than 1 inch in depth, at time of installation on an existing edgeboard

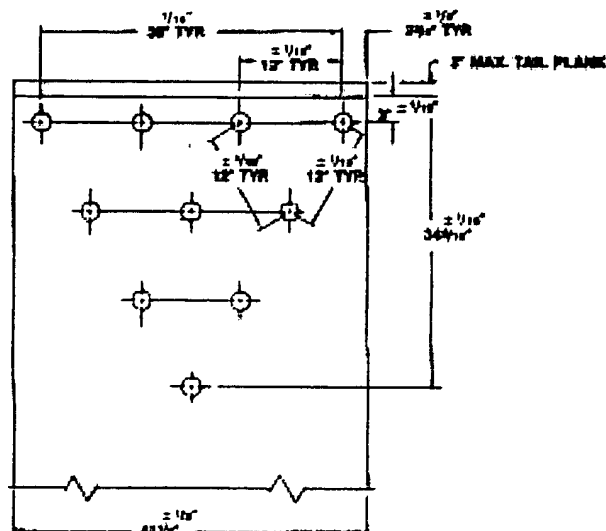
May be attached to the side of the pin deck nearest the gutters and at a minimum, shall extend from a point opposite the No. 1 pin to the pit. It must be installed vertically so the synthetic material exposed on the pin deck surface is not in excess of 1/2 inch.



The gap between the pin deck and the adjoining lane section, across the width of the lane, shall not exceed $\frac{50}{1000}$ inch.

1. Spaced 12 inches plus/minus $\frac{1}{16}$ inch, (non accumulative) in an equilateral triangular.
2. 3 inches, plus/minus $\frac{1}{16}$ inch, from the center of 7, 8, 9 and 10 pin spots to the pit (not including the tail plank).
3. 2 $\frac{3}{4}$ inches, plus/minus $\frac{1}{4}$ inch, from the center of the 7 and 10 pin spots to the adjacent side of the pin deck.

4. 12 $\frac{1}{16}$ inches, plus/minus $\frac{1}{16}$ inch, from the center of the 7 and 10 pin spots to the nearest kickback.
5. The No. 1 pin spot shall be equidistant from both edges of the lane and both kickbacks with a tolerance of plus/minus $\frac{1}{8}$ inch, and never less than 30 inches from its center to the kickbacks.
6. 31 $\frac{3}{16}$ inches, (reference dimension) from center of the No. 1 pin spot to a perpendicular line drawn through the centers of the back row of spots.
7. 34 $\frac{3}{16}$ inches from the center of the No. 1 pin spot, to the pit (not including the tail plank).



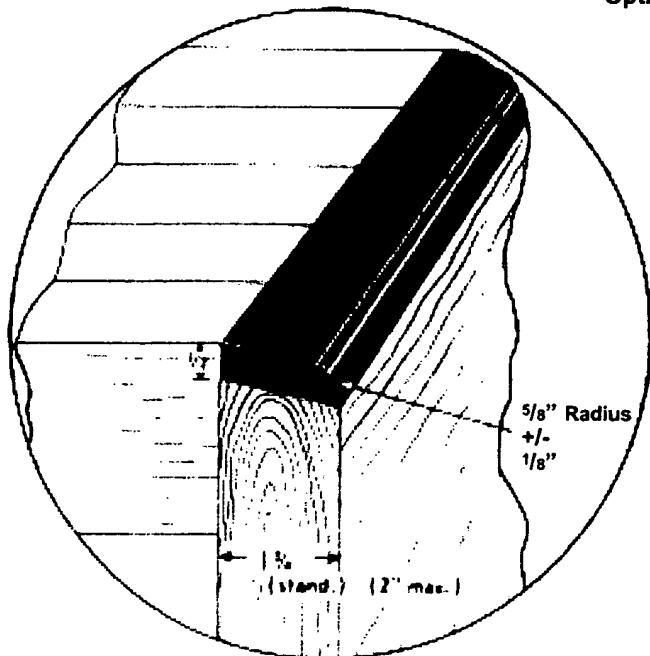
Tail Plank:

A tail plank, not to exceed 2 inches in thickness, may be attached to the rear of the lane. The tail plank may be constructed entirely of hardwood without testing but synthetic materials, alone or in combination with other materials, must be evaluated by ABC/WIBC before use.

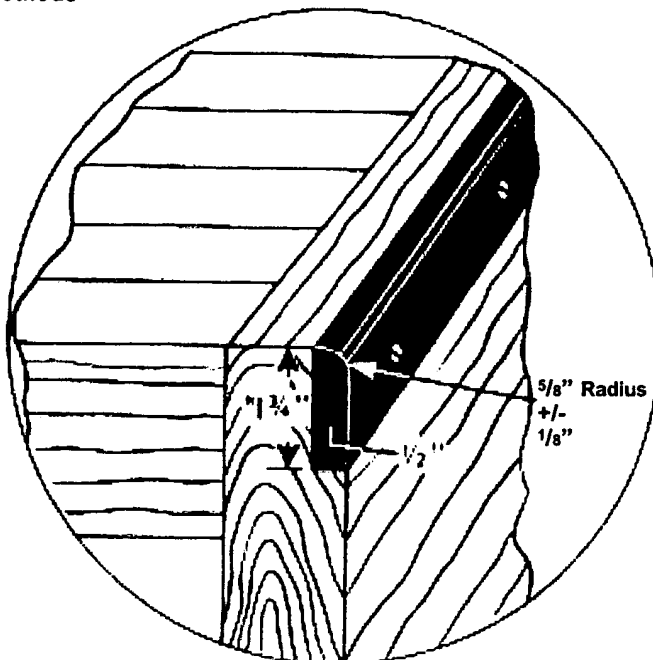
The exposed edge of the tail plank may be covered with a piece of synthetic material which must have a radius of $\frac{5}{8}$ inch, plus/minus $\frac{1}{8}$ inch at the intersection of the top edge and rear face of the tail plank. At no time may there be more than 5 inches of flat playing surface including the tail plank in back of the centers of the 7, 8, 9, and 10 pin spots.

REINFORCED TAIL PLANK

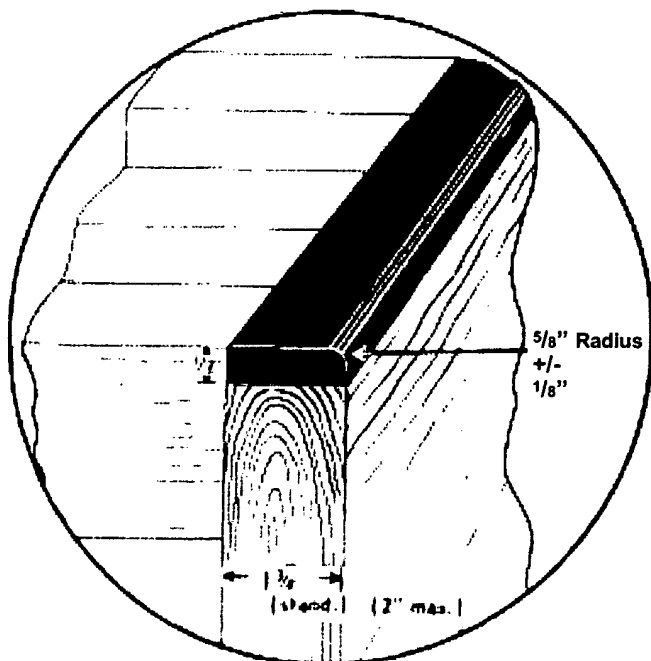
Optional Methods



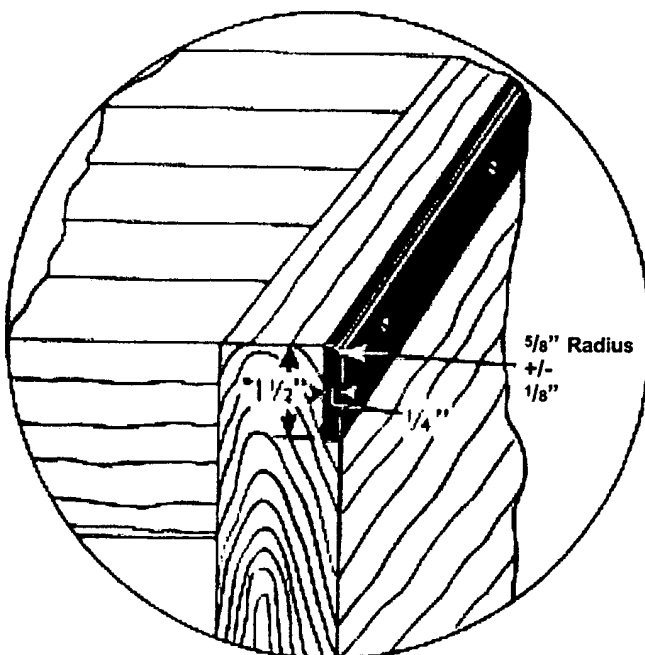
Fibre or Phenolic Applied
on Slanting Joint



Fibre or Phenolic Applied
on Right Angle Joint



Fibre or Phenolic Applied
on Exposed Edge



Fibre or Phenolic Applied
on Exposed Edge

GUTTERS

Gutters shall be placed on each side of the lane and shall begin at the foul line and extend parallel with the lane to the pit.

Round Gutters:

1. The width, shall be $9 \frac{1}{4}$ inch, plus/minus $\frac{1}{4}$ inch.
2. They must be concave in shape.
3. They must measure at least $1 \frac{7}{8}$ inch in depth at center at time of manufacture.

Flat Gutters:

Flat gutters, must be constructed of wood or other materials which have been tested according to ABC/WIBC procedures for the specified time period and approved.

1. The width shall be $9 \frac{1}{4}$ inches, plus/minus $\frac{1}{4}$ inch, including the molding.
2. From a point opposite or within 15 inches ahead of the No. 1 pin spot, the gutter must have square bottoms and must be at least $1 \frac{7}{8}$ inch beneath the surface of the lane.
3. Opposite the center of the rear row of pin spots the depth shall be $3 \frac{1}{2}$ inches, plus/minus $\frac{1}{8}$ inch.

Reinforced Flat Gutters:

1. The dimensions shall be the same as flat gutters.
2. The reinforcing material may cover the entire length and width of the bottom, or be 4 inches, plus/minus $\frac{1}{2}$ inch, in width and cover the total length.
3. If vulcanized fibre reinforcing is used, it shall not exceed $\frac{3}{16}$ inch in thickness.
4. If laminated phenolic reinforcing, Grade "C" or "CE", is used, it shall not exceed $\frac{1}{8}$ inch in thickness.

Flat Gutter Molding: (Solid Hardwood)

A strip of molding extending the entire length of the flat gutter shall be securely fastened to the bottom of the flat gutter. The molding may be constructed entirely of hardwood without testing. Synthetic materials, alone or in combination with other materials, which have been approved by ABC/WIBC after testing may be used.

1. They may not exceed $\frac{7}{8}$ inch high, at the leading edge, gradually increasing to a maximum of $1 \frac{1}{2}$ inches high opposite the 7 and 10 pin spots. (Measured from the top surface of the flat gutter to the top of the molding.)
2. They may not exceed $\frac{3}{4}$ inch in width.
3. The top exposed edge shall be rounded to a radius of $\frac{5}{8}$ inch, plus/minus $\frac{1}{8}$ inch.

Reinforced gutter optional methods

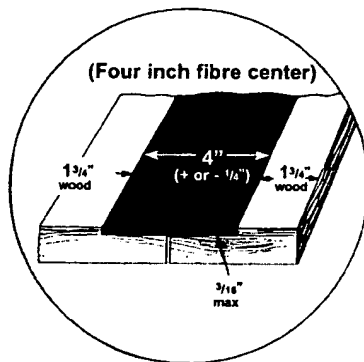


Figure A

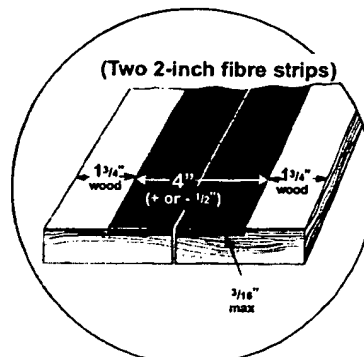


Figure B

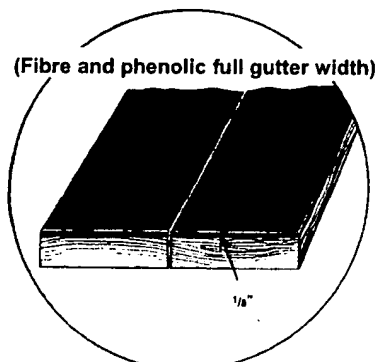


Figure C

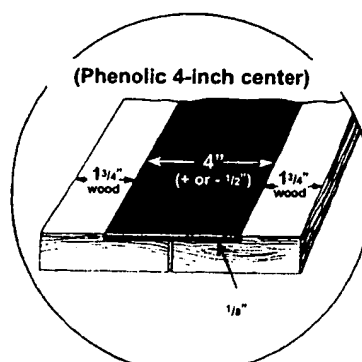


Figure D

Reinforced Flat Gutter Molding:

1. They must meet all physical dimensions of solid hardwood flat gutter molding.
2. The wearing surface may be reinforced from the pit to at least the point opposite the No. 1 pin spot.
3. If vulcanized fibre is used, it may not exceed $\frac{1}{4}$ inch when used on the side or $\frac{1}{2}$ inch thick when used on the top. (See drawing)
4. If laminated phenolic material Grade "C" or "CE" is used, it shall be $\frac{1}{8}$ inch thick.

Kickbacks:

The kickbacks may be constructed entirely of hardwood without testing. Synthetic materials, alone or in combination with other materials which have been approved ABC/WIBC after testing may be used. The kickbacks, or side partitions, shall be placed parallel to the lane and shall meet the following requirements:

1. It shall extend from a point opposite or within 15 inches ahead of the No. 1 pin spot to the rear cushion wall.
2. The distance between the wood faces of the two kickbacks shall be $60 \frac{1}{8}$ inches, plus/minus $\frac{1}{8}$ inch.
3. The height above the lane shall be $20 \frac{1}{2}$ inches, plus/minus $3 \frac{1}{2}$ inches.

The kickbacks, behind the tail plank, may be covered with impregnated fibre glass, hard vulcanized fibre, or laminated phenolic (Grade "C" or "CE").

Kickback Plates:

The kickbacks may be covered with a single layer of reinforcing material, not to exceed $\frac{3}{16}$ inch in thickness. The following materials may be used:

1. Hard vulcanized fibre.
2. Laminated phenolic (Grade "C" or "CE").
3. Rigid thermoplastic vinyl copolymer.

Other materials, may be used provided they have been tested and approved by ABC/WIBC.

Rear Cushion:

The rear cushion shall in all cases be covered with material of a dark color and shall be so constructed as to prevent the pins from rebounding onto the lane. (For pit and rear cushion measurements on automatic pinsetting devices see section on Automatic Pinsetting devices in this manual.)

Pit:

1. For lanes without automatic pinsetting devices, there shall not be less than 10 inches from the pit floor to the top of the lane and it shall not be less than $9 \frac{1}{2}$ inches from the top of the pit mat to the top of the lane. The pit shall not be less than 30 inches in depth from the rear edge of the lane (including the width of the tail plank as a portion of the measurement) to the face of the rear cushion.
2. For lanes with automatic pinsetting devices, see the diagrams on page 12.

Reinforced Gutter Molding Optional Methods

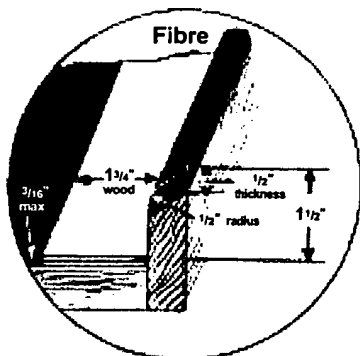


Figure A

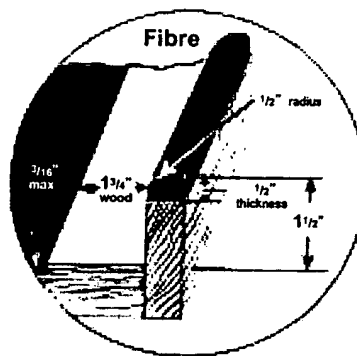


Figure B

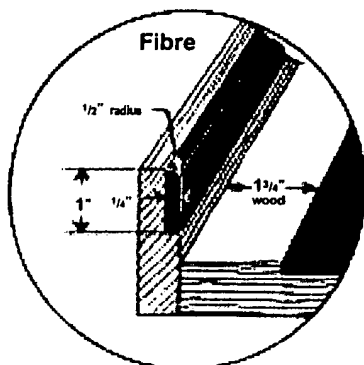


Figure C

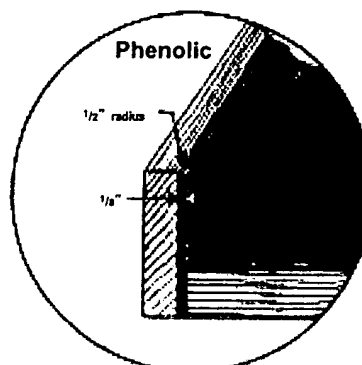
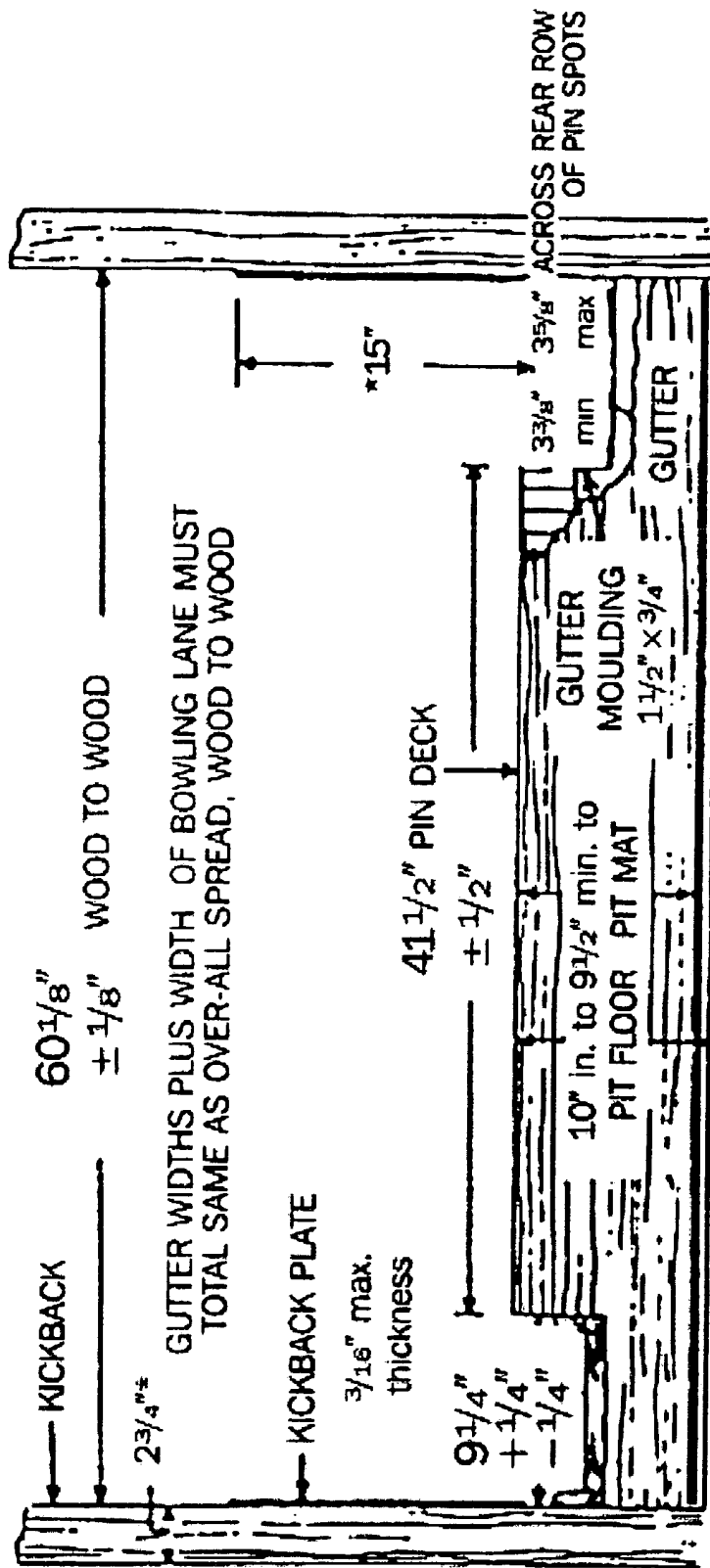


Figure D

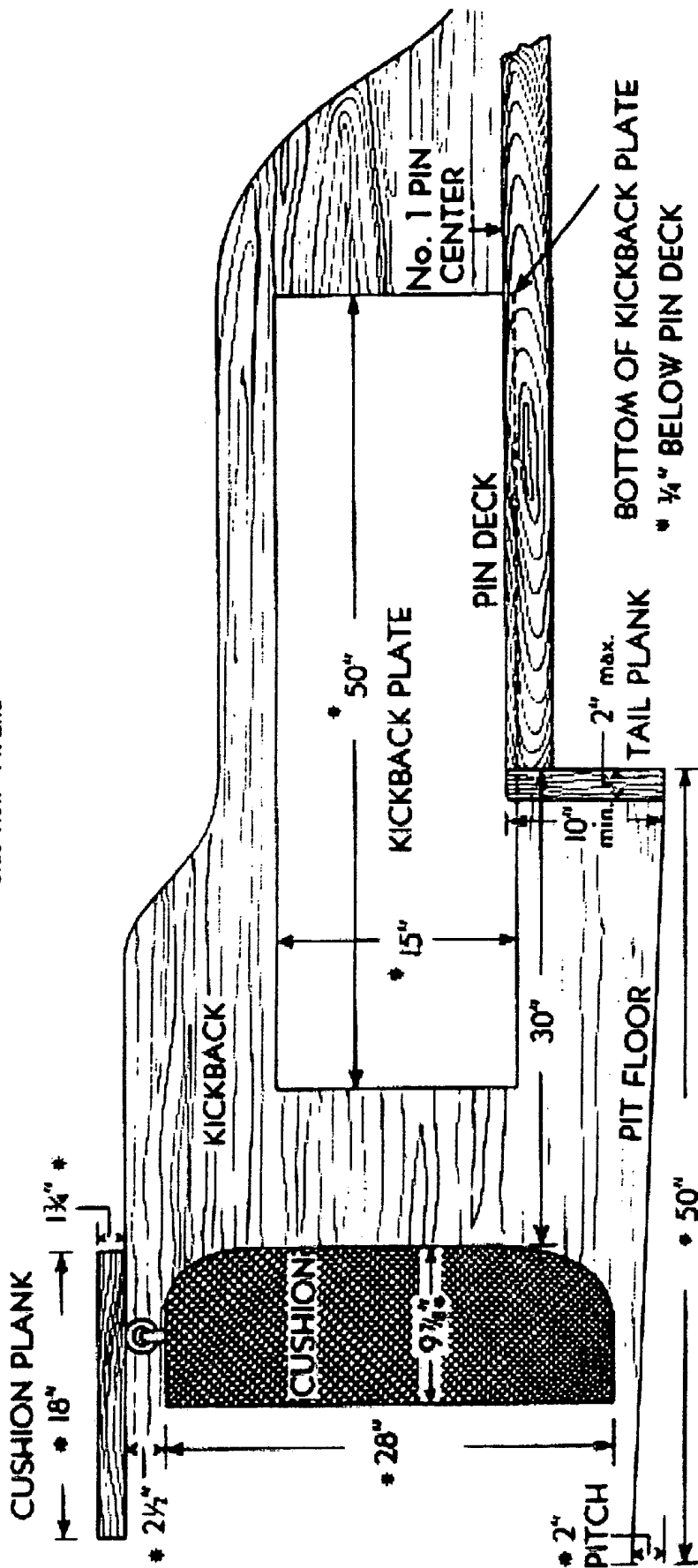
*Note: These are not specifications but accepted standards
For installing bowling lanes.

REGULATION BOWLING LANE DIMENSIONS PIT END VIEW



REGULATION BOWLING LANE DIMENSIONS

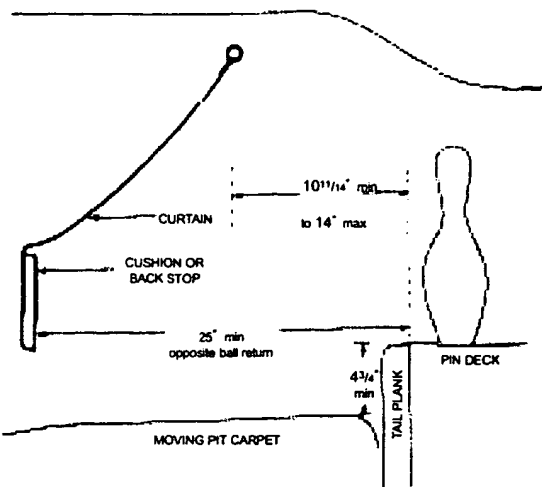
Side View - Pit End



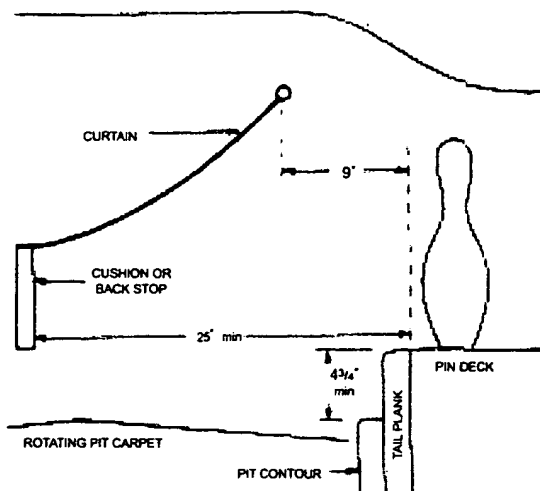
*Note: This particular measurement is not an ABC/WIBC specification but is an accepted standard for installing bowling lanes

PIT MEASUREMENTS — AUTOMATIC PINSETTING DEVICE

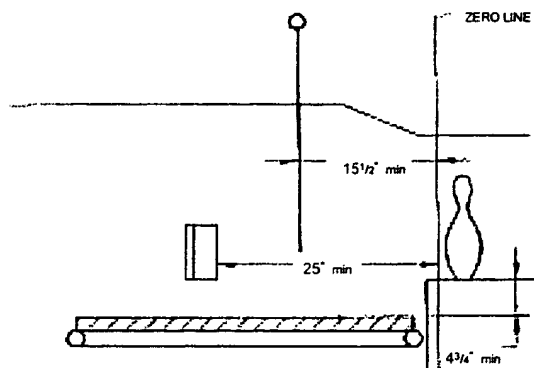
AMF/VANTAGE



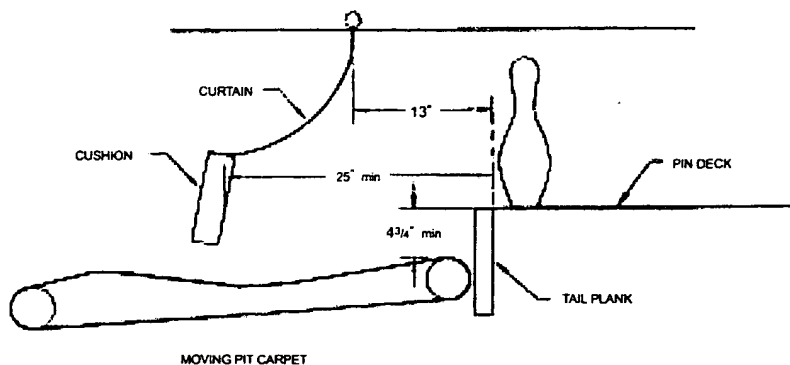
BOWL-MOR, and Z-3



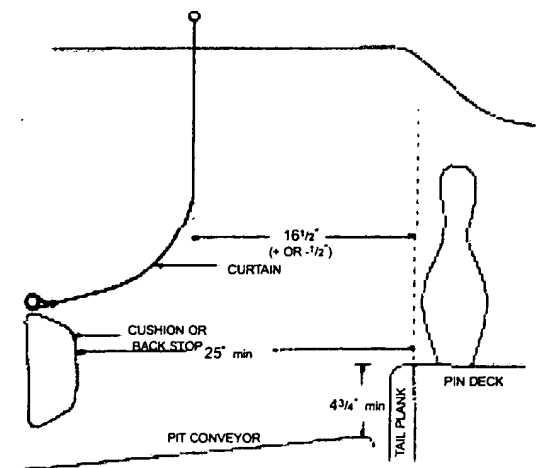
HEDDON H-300-R



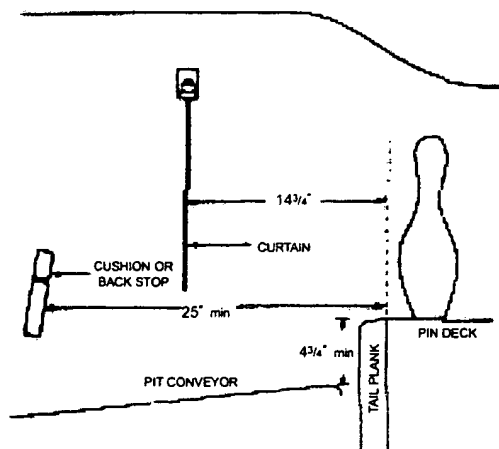
MEDES MM-2001



BRUNSWICK, HEDDON H-4, DACOS



BRUNSWICK GS-10



Appendix C

Related Proceedings

None.